The third general law of Prof. Forbes states that "the vibrations are proportional within certain limits to the difference of the conducting powers of the metals for heat, the metal having the least conducting power being necessarily the coldest." The evidence adduced against the first law appears to destroy this one also. The author however proceeds further, and reverses the conditions deemed essential by Prof. Forbes. Silver stands at the head of conductors; using it as the *cold* metal, he has obtained distinct tones with hot rockers of brass, copper and iron, placed upon it. These and other experiments show that the third general law is, like the two others, untenable. Prof. Forbes further states that two of the metals, bismuth and antimony, are perfectly inert; the author has however obtained distinct tones with both of these substances. He finally enters also into an examination of the arguments of Prof. Forbes against the views supported by Faraday, and shows how the facts adduced against the said views become, when duly considered, strong corroborative evidence of their correctness.

1. "The following letter from Prof. Dove to the Earl of Rosse, was read from the Chair."

Berlin, Jan. 7, 1854.

My lord,—The vast stock of observations daily gathered by British Observatories for the promotion of terrestrial physics, always impressed me, as a scientific man, with gratitude towards a nation so worthy of the happy privilege of interrogating nature in every part of the globe. To day, at the receipt of the unhoped-for honour awarded to me by the Royal Society (the Copley Medal), for labours in a great measure grounded on those observations, I feel myself called upon to express a more personal, and still deeper, sense of gratitude. May I beg of your Lordship to communicate to the Council and the Society my most respectful thanks for the approbation bestowed upon the result of my exertions?

I am, my Lord,

Your Lordship's most obedient Servant,

To the Earl of Rosse,
President of the Royal Society.

H. W. Dove.

2. "The following letter from Prof. Hansteen to Col. Sabine, was also read."

Observatory at Christiania, January 6, 1854.

Dear Sir,—At the end of last year I calculated formulæ of interpolation for different places in Europe, at which I had collected a sufficient number of observations of the magnetical inclination:

$$i=i_1+x+(t-t_0)y+(t-t_0)^2z, \quad \ldots\ldots\ldots\ldots \quad (\mathrm{I.})$$

where $i_1 + x$ is the inclination for the year t_0, x, y, z constants. The annual variation is,

$$\frac{di}{dt} = y + 2(t - t_0)z \quad \text{(II.)}$$

In all Europe at this time y has a *negative* value, and z a *positive* value; accordingly the variation is *decreasing*, and the dip approaching to a *minimum*. Assuming $\frac{di}{dt} = 0$, and the epoch of the minimum $= T$, you will find

$$T = t_0 - \frac{y}{2z} \quad \text{(III.)}$$

As y is *negative*, the last member of T will be positive, and $T > t_0$. In Siberia y is in the last 10—15 years *positive*, as well as z, and accordingly $T < t_0$. When y is *positive*, and z *negative*, as in Nertchinsk and Pekin in the following table, T is the epoch of a *maximum*.

The probable error of the constants x, y, z, and T, depends on the number and goodness of the observations, the number of years between the first and last, and their more or less symmetrical distribution between these. The most doubtful in the subjoined table are marked with one or two asterisks.

In examining the table, you will remark that the epoch T of minimum in Europe will arrive earlier in the northern than in the southern places (Paris to Christiania); earlier in the eastern than in the western places (Christiania, Stockholm, Petersburg, Kazan, Catharinenburg). For the theory of the magnetism of the earth, I think it of interest to determine this epoch for different points. In order to diminish the uncertainty in different points, I have written to Professor Gedersen in Copenhagen, to Encke in Berlin, to Gauss in Göttingen, and to Kupffer in Petersburg, and entreated them to make or communicate to me observations nearer to the actual year. And it is the same solicitation I now take the liberty to address to you for London. The only seven observations I know in London are made by Cavendish, 1775·78; Sabine, 1821·62; Segelike, 1830·91; Lloyd, 1836·50; Phillips, Ross, Johnson and Sabine, 1837·63; Phillips and Fox, 1838·30; Sabine and Ross, 1838·74. As fifteen years have elapsed since the last observation, and I suppose many observations have been made in the mean time, I would be extremely obliged to you, if you will be so kind to communicate them to me, or *procure a good determination to be made in this year*. In reliance upon your interest for this inquiry, to which you have devoted so earnestly your labour and time in a long series of years, I hope you will not be displeased at my entreaty; and in this hope I remain, Sir, with great respect,

Your most obedient Servant,

CHR. HANSTEEN.

(I.) Inclination of the Magnetic Needle.

$$i = i_0 + (t - t_0)y + (t - t_0)^2 z.$$

	n.	Between	t_0.	i_0.	y.	z.	T.	Lat.	Long. East from Paris.
Paris	20	1798—1851	1800	69° 40′ 80 ± 1′ 80	− 4′ 2081 + 0′ 175	+ 0′ 01173 ± 0′ 00341	1978·7 ± 52·2	48° 50′	0° 0′
Brussels	23	1827—1852	1827	69 1·93 ± 0·75	− 3·3954 ± 0·122	+ 0·01993 ± 0·00433	1912·2 ± 18·7	50 51	2 22
Berlin	12	1769—1837	1800	70 14·41 ± 2·24	− 4·2737 ± 0·056	+ 0·02166 ± 0·00261	1898·6 ± 12·0	52 31	11 2
Copenhagen*	6	1820—1847	1820	70 39·23 ± 1·41	− 2·8662 ± 0·101	+ 0·03292 ± 0·01182	1863·5 ± 18·0	55 41	10 15
Christiania	20	1820—1853	1820	72 41·44 ± 1·19	− 3·3488 ± 0·155	+ 0·03723 ± 0·00429	1862·9 ± 5·6	59 55	8 23
Stockholm	8	1825—1853	1825	72 3·84 ± 2·90	− 3·1268 ± 0·408	+ 0·04897 ± 0·01283	1856·9 ± 9·4	59 30	15 44
Petersburg	9	1830—1850	1830	71 11·62 ± 3·06	− 1·9806 ± 0·608	+ 0·04354 ± 0·02758	1852·7 ± 16·0	59 57	27 59
Kazan*	5	1828—1843	1828	68 28·76 ± 1·51	− 2·1065 ± 0·062	+ 0·12181 ± 0·05198	1836·6 ± 3·7	55 48	47 1
Catharinenburg	11	1828—1852	1828	69 42·56 ± 1·30	− 0·0230 ± 0·228	+ 0·03737 ± 0·09010	1828·3 ± 3·0	56 50	58 14
Nertchinsk	7	1832—1850	1832	66 30·19 ± 2·30	+ 4·7983 ± 0·187	− 0·03855 ± 0·02983	1855·1 ± 5·2	51 18	117 1
Pekin*	4	1831—1845	1831	54 47·62 ± 1·55	+ 6·3065 ± 0·359	− 0·13666 ± 0·02581	1854·1 ± 4·6	39 54	114 5
Gibraltar**	4	1840—1847	1840	59 49·47 ± 9·47	− 11·346 ± 6·103	+ 0·40193 ± 0·6244	.....	36 4	− 7 34
London*	7	1775—1838	1821·62	70 3·10 ± 0·53	− 2·8549 ± 0·00265	+ 0·00809 ± 0·00081	1997·9 ± 18·1	51 31	− 2 25
Göttingen*	5	1806—1842	1806	69 30·86 ± 3·12	− 3·4688 ± 0·1067	+ 0·01213 ± 0·01106	1949·0 ± 130·5	51 31	7 34
New York*	4	1823—1846	1822	73 7·31 ± 3·26	− 0·9484 ± 0·5311	− 0·00506 ± 0·02038			
Sitka	4	1829—1845	1829	75 45·28 ± 0·18	− 1·8704 ± 0·1237	+ 0·15271 ± 0·00747	1835·1 ± 0·5	57 3	222 25

(II.) i and $\frac{di}{dt}$ reduced to 1840·0.

	Lat.	Long. E. from Paris.	i.	$\frac{di}{dt}$.
	° ′	° ′	° ′	′
Paris	48 50	0 0	67 11·24	−3·2700
Brussels	50 51	2 22	68 21·16	−2·8772
London	51 31	−2 25	69 13·36	−2·5572
Göttingen	51 31	7 34	67 46·83	−2·6434
Berlin	52 31	11 2	67 58·12	−2·5394
Copenhagen	55 41	10 15	69 55·07	−1·5495
Christiania	59 55	8 23	71 49·36	−1·8597
Stockholm	59 30	15 44	71 27·96	−1·6578
Petersburg	59 57	27 59	70 56·17	−1·1098
Kazan	55 48	47 1	68 21·02	+0·8169
Catharinenburg ..	56 50	58 14	69 47·67	+0·8739
Nertschinsk	51 18	117 1	67 6·11	+4·1819
Pekin	39 54	114 5	55 33·11	+3·8466
Sitka	57 3	222 25	75 46·16	+1·4892
New York	40 43	283 31	72 48·27	−1·1307

These variations are in good harmony with the general motion of the magnetical system from west to east in the northern hemisphere. C. H.

3. A letter was also read from Dr. Rigby addressed to the Secretary, communicating a circular from the Committee of the Seckenberg Society of Natural History at Frankfort, respecting the celebration of the 50th Anniversary of Prof. Tiedemann's doctorate.

February 2, 1854.

COLONEL SABINE, R.A., Treas. & V.P., in the Chair.

The following papers were read :—

1. "Sur la Théorie de l'orientation du Plan oscillatoire du Pendule simple, et son application à la recherche de l'aplatissement du sphéroide terrestre." By M. Oliveira. Communicated by Charles Babbage, Esq., F.R.S. &c. Received January 18, 1854.

In this memoir the author first deduces a formula upon *geometrical* considerations *alone*, expressing the deviation of a free pendulum (like Foucault's) in terms of the latitude and difference of meridians, or hour-angle; and this is done (as far as appears) without any reference to the *dynamical* considerations on which Foucault's formula is deduced, assuming only the inertia of the pendulum.

The author's formula assumes the earth to be a *sphere*. If now, observation should give a slightly different deviation, the author infers that this would be due to the *ellipticity* of the earth; and in-